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ABSTRACT

Pre-Kindergarten children's diagnostic screening and standardized test scores from 1979 to 1984 were analyzed to compare the school achievement of children placed in a developmental kindergarten program (DKP) with children given regular instruction. Of 475 subjects, 81 participated in a DKP, while 394 did not. Statistical analyses were performed to determine the overall significant difference between the two groups on current reading and mathematics scores, to identify which of 10 variables best predicted children's future performance as measured by the Scott Foresman Reading and Math Subtests, and to determine how much variance in current reading and math scores is explained by individual variables used in the screening. Screening variables were sex, grade, year screened, treatment group, number of years in school, intelligence quotient, readiness survey total, language development, visual motor development, and gross motor development. Findings suggested that (1) the placement of children in the developmental program was quite adequate; (2) for prediction purposes, the Readiness Survey Total is a very good screening instrument; and (3) children placed in the DKP were still not on a par with those not so placed. (Author/RH)

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Longitudinal study of the Developmental Kindergarten Program in the Glen Cove City School District

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Running head: LONGITUDINAL STUDY OF DEVELOPMENTAL KINDERGARTEN

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Abstract

The present study evaluated the significant difference in the current achievement levels of children who were in a Developmental Kindergarten Program (DKP) and children who were not in the program. Data from diagnostic screening scores (10 independent variables) and standardized measuring instruments (2 dependent variables) for all pre-kindergarteners from 1979 through 1984 were gathered. From a total of 475 subjects, 81 received the program (treatment) and 394 did not receive the treatment. The following statistical analyses were used: Multivariate Analysis of Variance, Discriminant Analysis, and Multiple Regression Analysis with a Forward Solution. The following conclusions were found: (a) The placement of children in the DKP by school personnel was quite adequate; (b) the Readiness Survey Total alone is a very good screening instrument for prediction purposes; and (c) the children who received the DKP were still not on par with those children who were [redacted] identified as not requiring that treatment.

EVALUATION REPORT

Program	The Development Kindergarten Program
Program location	Glen Cove City School District
Report submitted to	Dr. Robert M. Finlely - Superintendent of Schools
Period covered by report	Spring of 1979 through 1984
Date submitted	April 1985 report

Section I. Overview

The Glen Cove City School district pioneered a diagnostic screening program in 1971 with the objective of insuring early school success among its students. The diagnostic screening program attempted to match students with programs of instruction appropriate to their developmental needs. Since the New York State mandate, slight modifications were implemented to meet State requirements. The diagnostic screening team comprised of school psychologists, teachers, and medical staff was responsible for meeting the mandate.

One of the programs in which a child could be placed was the Developmental Kindergarten Program. A student may be placed in the Developmental Kindergarten Program with the consent of the parents or guardians if screening indicated that a child needed additional preparation in any one or more of the following areas: language usage and comprehension, understanding visual or basic concepts and/or negotiating the physical environment. The Developmental Kindergarten Program, initiated in 1979, was developed by administrators, psychologists, teachers, and nurses in the Glen Cove City School District.

Children in the Developmental Kindergarten Program received reinforcement in the basic concepts and skills.

They were also provided with the extra support and attention they needed for a successful transition to the regular classroom. In addition, children who required remediation received the services of a school psychologist, and/or speech therapist, and/or English as a Second Language teacher. This program, which is district funded, was started in the 1979-1980 academic school year at the Deasy Elementary School and is in operation at other schools in the district at the writing of this report.

This report is on the quantitative longitudinal research study which was conducted to determine if, at present time, there is a significant difference between the current achievement levels of those students who were in the Developmental Kindergarten Program and those students who were not. All available data from the diagnostic screening scores and standardized measuring instruments for all pre-Kindergarten children from 1979 through 1984 were gathered. These date provided the basis for the study. Statistical analyses were then calculated for the group of children who were in the program and for the group of children who were not in the program to determine the following:

1. The overall significant difference between the two groups on their current reading and math scores.

2. Identify the variables which best predict how the children will perform as measured by the Scott Foresman Reading and Math Subtests.
3. Determine how much variance in the current Reading and Math scores is explained by which variables used in the screening.

The findings and recommendations for further evaluation of this program are reported below.

Section II. Description of the Evaluation Study

Dr. Robert M. Finley, Superintendent of the Glen Cove City Schools, requested an evaluation of the district's Developmental Kindergarten Program. The study was to locate all students that were in the program, since its inception in 1979, and to statistically analyze how these students were achieving academically in comparison to those students who did not require the program.

The first step in this evaluation was to gather all available screening data on all pre-Kindergarten students from 1979 through 1984, district wide. This encompassed 5 elementary schools.

Table 1 shows the number of subjects screened each year from 1979 through 1984, the number of subjects

given the treatment Developmental Kindergarten Program and those who did not require the treatment.

Insert Table 1 about here

Table 1 shows that 157 subjects received the treatment, 821 did not receive the treatment, and that a total of 978 subjects were screened since 1979. A total of 503 subjects were eliminated from the study as a result of missing data. Therefore from a total population of 475 subjects, 81 received the treatment and 394 did not receive the treatment.

Ten variables used in the screening process constituted the group of independent variables in the study. Screening data were recorded for all 10:

1. Sex
2. Grade
3. Screened Year
4. Treatment Group
5. Number of Years in school
6. Intelligence Quotient
7. Readiness Survey Total
8. Language Development
9. Visual Motor
10. Gross Motor

The 2 dependent variables, Total Reading and Total

Math, were recorded from a commercially published test, the Scott Foresman Achievement Test, for all subjects tested in the Spring of 1984. This instrument was found to be highly reliable and valid.

A Multivariate Analysis of Variance (MANOVA) was used to determine if there were any significant differences between the 2 groups of subjects on the two dependent variables. Since it was found that there were overall statistically significant differences between the 2 groups of subjects in the MANOVA, a Discriminant Analysis was applied for the purpose of identifying which independent variables contributed to differentiating the two groups (Kerlinger, 1964; Pedhazur, 1973; Hull, Nie, Jenkins, Steinbrenner, & Bent 1981; Hull & Nie, 1981).

Also, a Multiple Regression Analysis with a Forward Solution was applied to determine how much variance was accounted for by each independent variable used for the purpose of prediction. This method would help select the best predictors for future screenings and eliminate those that do not contribute to predicting future success (Kerlinger, 1964; Pedhazur, 1973; Hull et al., 1981; Hull & Nie, 1981).

Section III. Results

Table 2 shows the descriptive statistics for the independent variables.

Insert Table 2 about here

Table 2 shows that, overall, the Developmental Kindergarten Subjects' scores reflected lower group means as compared to those subjects not requiring the program.

Table 3 shows the MANOVA descriptive statistics for each group. This includes the number of subjects, and the means and standard deviations obtained on the 2 dependent variables. Also the level of significance for the 2 groups on both dependent variables: Total Reading and Total Math.

Insert Table 3 about here

The results in Table 3 are a product of MANOVA Analysis. There is a difference in the means for Total Reading, 48.60 for group 1 and 60.07 for group 2. There is also a difference in the means for Total Math, 47.00 for group 1 and 60.88 for group 2. Wilk's Lambda was used as the multivariate test of significance for the group effects (Kerlinger, 1964; Pedhazur, 1973; Hull & Nie, 1981; Hull et al., 1981). The difference was found to be statistically significant at $p < .00001$ with an F

of 7.29 and (2,472) degrees of freedom. After statistical significance was found in the MANOVA, a Discriminant Analysis was applied.

Table 4 shows that since there were 2 groups in this study, the maximum number of Discriminant Functions would be 1.

Insert Table 4 about here

The above Table 4 shows Wilk's Lambda at .4334 which is meaningful and significant at p <.0001. The cannonical correlation at .7526 is a high correlation with the groups. The cannonical correlation shows the discriminant function's importance. In this case it is very important. In fact the one function is accounting for 100% of the variance.

A Forward Solution in Multiple Regression Analysis was applied to statistically determine which of the variables contributed the most variance to the total variance. The correlations in the Forward Solution show that Readiness Survey Total is the best predictor by itself in relationship to Total Reading with a .487 correlation. The second best predictor to Total Reading with a .467 correlation is Language Development. The third predictor with a .320 correlation is Visual Motor. Readiness Survey Total is also the best predictor by

itself in relationship to Total Math with a .335 correlation. The second best predictor to Total Math is Language Development with .263 correlation.

Table 5 shows the classification results of the members of the 2 groups.

Insert Table 5 about here

Table 5 shows statistically, through Discriminant Analysis, that 78 subjects (96.3%) placed in group 1 should be in group 1 and 3 subjects (3.7%) placed in group 1 should be in group 2; 357 subjects (90.6%) in group 2 should be in group 2 and 37 subjects (9.4%) in group 2 should be in group 1. It cannot be over-emphasized here that the placement of the subjects through Discriminant Analysis is primarily based on the independent variables used in the study, and should not be a reflection on the placement by school personnel where other variables may be taken into consideration for placement. If anything, these findings confirm that the placement record by the school personnel is quite adequate.

The Forward Solution in Multiple Regression with Total Reading as the criterion variable entered Readiness Survey Total first on step number 1 since it had the highest zero order correlation. Table 6 shows

the R^2 results when Readiness Survey Total is entered first.

Insert Table 6 about here

Table 7 shows the R^2 results when Visual Motor is entered in step 2. After partialing out Readiness Survey Total in the equation, Visual Motor has the highest partial correlation with the criterion and is therefore entered next.

Insert Table 7 about here

Both Tables 6 and 7 are statistically significant. The R^2 in Table 6 accounts for approximmately 24% of the variance in the criterion, Total Reading, with no R^2 Change since it was entered first. The R^2 in Table 7 accounts for 26% of the variance in Total Reading with an R^2 Change (porportion of variance incremented) of 1.9 percent.

Section IV. Discussion of Results

A non-experimental, longitudinal, quantitative research design was used in this study. All the subjects in this study came from one school district, Glen Cove. The subjects selected were all pre-Kindergarten children residing in Glen Cove and screened in the Spring of

1979, '80, '81, '82, and '83. Spring of 1983 was selected as the cut off because in the Spring of 1984 the Scott Foresman Achievement Test are administered to all grade levels except Kindergarten. Therefore those children screened in Spring of 1983 would still be in Kindergarten in Spring of 1984. Eventually, the total number of 978 screened subjects diminished to 475 due to a lack of data for the variables selected. The total number of subjects were divided into 2 unmatched groups: 81 subjects who were in the Developmental Kindergarten Program and 394 subjects who were not in the program. The Sample size was adequate for the statistical analyses used.

Ten independent variables were selected based on validity, reliability, and objectivity from a pool of variables used in the screening process. The two dependent variables were two subtest scores taken from the standardized Scott Foresman Achievement Test administered to all subjects in the Spring of 1984.

The 2 groups, those who were in the Developmental Kindergarten Program and those who were not, were academically different before they were screened. The screening process helped to identify those students who were in need of remedial instruction. The results from the MANOVA show that, presently, there still exists a

statistically significant difference between the 2 groups. The findings, from the Discriminant Analysis, show that most of the children were screened and placed in the groups into which they should have been placed.

The statistically significant results in the Forward Selection of Multiple Regression Analysis show that, of all the variables selected in the study, Readiness Survey Total had the greatest amount of variance. Therefore, Readiness Survey Total, contributed the most to the prediction of how a student will perform on the Total Reading and Total Math subtests of the Scott Foresman Achievement Test. The Readiness Survey Total may be sufficient as a screening device since adding the other screening variables does not improve the prediction of how children will perform on Scott Foresman Achievement Tests to any significant degree.

Section V. Conclusions and Recommendations

The findings DO indicate that children who were identified as in need of remedial instruction and were placed in the Developmental Kindergarten Program are still not on a par with those students who were identified as not requiring remedial instruction treatment and were not placed in the Developmental Kindergarten Program. It must be emphasized that the

findings in this report are not to be interpreted as the effects of a particular program on children identified as in need of remedial instruction. The findings DO NOT indicate positive or negative academic achievement effects on children as a result of the Developmental Kindergarten Program.

Further analysis of the predictor variables showed recommendation to the district and to New York State, in regard to the screening process mandated by the State, is to use the Readiness Survey Total as a primary screening measure and predictor of performance on the Total Reading and Total Math from the Scott Foresman Achievement Test. Other variables MAY be used in addition to the Readiness Survey Total. However, they do not improve the prediction by any significant amount. The administering of the Readiness Survey Total as the primary psychometric measure in the screening process would eliminate the necessity of additional tests thus reducing time, effort, and money significantly.

Finally, it is recommended that the district conduct an evaluation of the relative effectiveness of the Developmental Kindergarten Program based on a true experiment and fairly objetive measures.

References

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Table 1

Number of Subjects

Screening Year	Treatment	No Treatment	Total
1979-'80	32	162	194
1980-'81	22	181	203
1981-'82	29	180	209
1982-'83	47	142	189
1983-'84	27	156	183
Total	157	821	978

Table 2

Group Means and Standard Deviations for 10 Variables

Variables	Group Means Groups		Group Standard Deviation Groups	
	1	2	1	2
Sex	1.43	1.52	0.50	0.50
Grade	2.86	3.39	1.08	1.10
Screening Year	80.79	80.56	1.13	1.10
Treatment Group	1.00	2.00	0.00	0.00
Years in School	4.21	4.44	1.13	1.10
I.Q.	97.98	106.99	21.50	15.37
Readiness Survey Total	20.46	61.70	18.86	21.07
Language Development	17.25	59.86	14.40	24.36
Visual Motor	30.04	51.63	20.68	24.75
Gross Motor	8.90	10.51	2.77	1.93

Table 3

MANOVA: Groups, Means, Std. Dev., Sign. F., Dep. Var.

		Total Reading		Total Math	
Groups	N	Mean	Std. Dev.	Mean	Std. Dev.
1	81	48.60	15.34	47.00	16.34
2	394	60.07	14.25	60.88	17.74
Totals	475	58.11	15.06	58.51	18.25

Approximmate F = 27.29 Level of F = .00001

Table 4

Cannonical Discriminant Functions

Function	1	After Function	0
Percent Variance	100	Wilk's Lambda	.4334
Cannonical Correlation	.7526	Degrees of Freedom	11
		Significance	.00001

Table 5

Classification Results

Actual Group	No. of Cases	Predicted Group Membership	
		1	2
Group 1	81	79(96.3%)	3(3.7%)
Group 2	394	37(9.4%)	357(90.6%)

Table 6

Multiple R	0.487	R^2 Change	0.237
R Square	0.237	F Change	147.080
Adjusted R	0.236	Sign. Change	0.00001
Standard Error	13.163		

Analysis of Variance

	D.F.	Sum of Squares	Mean of Squares
Regression	1	25485.408	25485.408
Residual	473	81959.678	173.276

F = 147.080 Significant F = 0.00001

Table 7

Multiple R	0.507	R^2Change	0.0197
R Square	0.257	F Change	12.4835
Adjusted R	0.254	Sign. Change	0.0005
Standard Error	13.007		

Analysis of Variance

	D.F	Sum of Squares	Mean Square
Regression	2	27597.23	13798.62
Residual	472	79847.86	169.17

F = 81.567 Significant F = 0.00001